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IMPROVED GUTTER SYSTEM

CROSS REFERENCE

This application claims the priority of International Application No. PCT/US05/26767, filed on July 27, 2005, which claims the priority of U.S. Provisional Patent Application No. 60/591,546, filed July 27, 2004, the terms of which are
5 incorporated herein by reference.

BACKGROUND OF THE INVENTION

This invention relates generally to gutter systems, and more particularly, to gutter systems for preventing debris from entering the gutter system.

10 Many gutter systems have been developed to prevent debris, such as leaves, twigs and paper, from obstructing or clogging the flow of water through the gutters to downspouts that distribute the runoff water away from structures, such as homes, office buildings, etc. For example, gutter screens that act to filter out debris without restricting the flow of water into the gutter have been developed and are commonly known. While
15 these systems have been somewhat successful in preventing debris from entering gutters, a continual need exists for developing novel approaches for providing better solutions to this problem for homeowners.

SUMMARY OF THE INVENTION

A gutter system for preventing leaves and other debris from obstructing a gutter is
20 provided. The gutter system includes a bracket and a gutter cover, the bracket being removably coupled to a hanger and removably secured to the gutter cover. An alternative embodiment of this invention is also provided where the bracket and hanger form an integrated structure or integrated bracket. Yet a further embodiment of the present

invention is described, which includes an extension member for allowing integrated brackets to fit gutters of varying depths.

A better understanding of the objects, advantages, features, properties and relationships of the invention will be obtained from the following detailed description and
5 accompanying drawings which set forth illustrative embodiments that are indicative of the various ways in which the principles of the invention may be employed.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention, reference may be had to preferred
10 embodiments shown in the following drawings in which:

Figure 1 illustrates a perspective view of a prior art gutter system, which is attached to a structure;

Figure 2 illustrates a perspective view of a gutter system employing a gutter cover;

15 Figure 3 illustrates a perspective view of a gutter cover;

Figure 4 illustrates a side view of the gutter cover shown in Fig. 3;

Figure 5 illustrates a front view of the gutter cover shown in Fig. 3;

Figure 6 illustrates a top view of the gutter cover shown in Fig. 3;

Figure 7 illustrates a rear view of the gutter cover shown in Fig. 3;

20 Figure 8 illustrates a top view of a sheet of material prior to its being formed into a gutter cover;

Figure 9 illustrates a perspective view of a first embodiment of a gutter bracket;

Figure 10 illustrates a side view of the gutter bracket shown in Fig. 9;

Figure 11 illustrates a front view of the gutter bracket shown in Fig. 9;

Figure 12 illustrates a top view of the gutter bracket shown in Fig. 9;

Figure 13 illustrates a perspective view of a second embodiment of a gutter bracket;

5 Figure 14 illustrates a side view of the gutter bracket shown in Fig. 13;

Figure 15 illustrates a front view of the gutter bracket shown in Fig. 13;

Figure 16 illustrates a top view of the gutter bracket shown in Fig. 13;

Figure 17 illustrates a rear view of the gutter bracket shown in Fig. 13;

Figure 18 illustrates a perspective view of an extension member capable of being
10 coupled to the gutter bracket shown in Fig. 13;

Figure 19 illustrates a side view of the extension member shown in Fig. 18;

Figure 20 illustrates a front view of the extension member shown in Fig. 18;

Figure 21 illustrates a top view of the extension member shown in Fig. 18;

Figure 22 illustrates a rear view of the extension member shown in Fig. 18;

15 Figure 23 illustrates a perspective view of the extension member shown in Fig. 18
coupled with the gutter bracket shown in Fig. 13;

Figure 24 illustrates a perspective view of an inside corner mullion;

Figure 25 illustrates a side view of the corner mullion shown in Fig. 24;

Figure 26 illustrates a front view of the corner mullion shown in Fig. 24;

20 Figure 27 illustrates a top view of the corner mullion shown in Fig. 24;

Figure 28 illustrates a rear view of the corner mullion shown in Fig. 24;

Figure 29 illustrates a perspective view of an outside corner mullion;

Figure 30 illustrates a side view of the corner mullion shown in Fig. 29;

Figure 31 illustrates a front view of the corner mullion shown in Fig. 29;

Figure 32 illustrates a top view of the corner mullion shown in Fig. 29;

Figure 33 illustrates a rear view of the corner mullion shown in Fig. 29;

Figure 34 illustrates a perspective view of a gutter end cap;

5 Figure 35 illustrates a side view of the gutter end cap shown in Fig. 34;

Figure 36 illustrates a front view of the gutter end cap shown in Fig. 34;

Figure 37 illustrates a top view of the gutter end cap shown in Fig. 34; and

Figure 38 illustrates a rear view of the gutter end cap shown in Fig. 34.

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DETAILED DESCRIPTION

Turning now to the figures, wherein like reference numerals refer to like elements, there is illustrated a gutter system 10, which is attached to a structure 20. As particularly illustrated in Figs. 2 through 38, the gutter system 10 is generally comprised of a gutter 30, a hanger 40 and a gutter cover 50.

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As shown in Fig. 1, for attaching prior art gutter systems to a structure, a hanger 40 is positioned transverse to the gutter 30 and a nail, screw or other attachment means is inserted through gutter 30, hanger 40 and fascia 22 of structure 20. The combination of the attachment means, hanger 40 and fascia 22 also act to strengthen the structural integrity of the gutter 30. Gutters 30 generally consist of a front wall 32, a bottom wall 34 and a rear wall 36, where the rear wall interfaces with the fascia 22 of structure 20.

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To prevent debris, such as leaves, twigs and paper from entering and being lodged within gutter 30, a gutter cover 50 may be provided. As shown in Fig. 2, the gutter cover may include a lip section 52, a middle section 54 and a back section 56. It should be

understood by those with skill in the art that the gutter cover 50 blocks substantially all of gutter opening 38. Runoff water from structure 20 is slowed by gutter cover 50 in order to allow surface tension of the water as it flows over the gutter cover 50 to cause the water to adhere to the lip section 52 and be redirected into gutter 30 without allowing debris to enter gutter 30. For slowing the flow of runoff water from the structure and facilitating the surface tension effect of the water, a protrusion 54a, as shown in Figs. 3 through 7, may be provided that extends along the entire width of gutter cover 50 in a direction that is substantially parallel to gutter 30. Protrusion 54a is preferably located on the middle section 54, but may also be located at different points on the gutter cover 50 as well. The middle section 54 of gutter cover 50 also includes a fold 58, which will be discussed in detail below.

As gutter covers 50 generally come in five or ten foot sections, most structures will require several sections of gutter covers 50 to accommodate each side of the structure 20. To prevent leakage at the seams that adjoin the respective gutter covers 50, a notch 59 may be provided on each gutter cover 50 during its manufacture similar to the notch 59 on the unformed gutter cover 60 shown in Fig. 8. Further, once the unformed gutter cover 60 is shaped into a completed gutter cover 50, as depicted in Fig. 3, the notch 59 becomes covered by fold 58. Notch 59 allows two gutter covers 50 to be removably coupled to one another by positioning a portion of one gutter cover 50 within the area created by notch 59 in the other gutter cover 50. In this manner, a small portion of the second gutter cover 50 will overlap a small portion of the first gutter cover 50, thus preventing leakage. Although the shape of notch 59 shown in Fig. 8 is generally rectangular, it should be understood that other shapes may also be employed, as long as

one gutter cover 50 is able to be fitted within an adjoining gutter cover 50 to create an aesthetically pleasing seal or joint between the two gutter covers. While gutter cover 50 is preferably comprised of aluminum, gutter cover 50 may also be made of other metals, vinyl materials, plastic or any other material which is light-weight, inexpensive and
5 capable of acting as a rigid support member.

To provide structural support to gutter 30 and gutter cover 50, a bracket 100 may be provided. Figs. 9 through 12 depict a first embodiment of bracket 100. Bracket 100 may be further comprised of pins 102, a base member 104, a front member 106, a rear member 108 and an intermediate member 110. For attaching bracket 100 to prior art
10 hangers 40, such as the hanger 40 shown in Fig. 1, pins 102 may be designed to correspond to apertures 42 (not shown) that are formed within standard hangers 40. While pins 102 are designed to be snap-fit within apertures 42, it should be appreciated that there are other ways in which the bracket 100 may be removably secured to hanger 40 and the description herein with respect to pins 102 should not be viewed as limiting
15 the scope of this application. For example, screws or other fastening means may also be used.

For strengthening the structural integrity of the bracket 100, a central wall portion 122 that fills in the area between the front member 106, intermediate member 110, rear member 108 and the base member 104 may also be provided. The central wall portion
20 122 may also include a plurality of apertures for allowing objects to extend transversely through the bracket 100 or to be attached to the bracket 100. For example, a first aperture 124 may be provided to receive a heating member, such as a wire or coil, that may be run perpendicularly to the bracket 100 to counteract gutters being blocked by ice or snow. In

addition, a second aperture (not shown) may be provided to receive an attachment means, such as straps. The strap may be used to connect the bracket 100 to the structure by fastening one end of the strap to the structure 20 and tying the other end to the second aperture of the bracket 100.

5 As shown in Fig. 9, front member 106 is formed to match the geometry of the lip section 52 of gutter cover 50. This provides structural support for gutter cover 50 and prevents the collapse of gutter cover 50 within the opening 38 of gutter 30, as a result of heavy loading by snow or other debris. To provide additional structural support for gutter cover 50, intermediate member 110 may also be configured to mirror the geometry
10 of the gutter cover 50. Bracket 100 may also be removably coupled to gutter cover 50 by inserting coupling member 112, which acts as a male member, into the area formed by fold 56, which acts as the female member.

 In addition to increasing the structural support for gutter cover 50, coupling member 112 also acts to prevent upward force on the gutter cover 50 from peeling the
15 gutter cover 50 back and thereby potentially allowing debris to enter the gutter system 10, and to form an integrated gutter system 10 that links gutter 30, gutter covers 50, brackets 100 and fascia 22 together. Moreover, this is accomplished without requiring screws or other fasteners to attach gutter cover 50 to bracket 100, which avoids requiring
unnecessary holes to accommodate such fasteners and potential leakages caused by such
20 holes. Bracket 100 may be formed by using standard injection molding techniques. While the bracket 100 is preferably comprised of injection molded plastic, bracket 100 may also be made of other metals, vinyl materials, plastic or any other material that is light-weight, inexpensive and capable of acting as a rigid support member. Bracket 100

may also assume varying shapes and thicknesses depending on the environment with which it is being used without departing from the scope of this invention.

Coupling member 112 also facilitates the installation of gutter cover 50 by establishing a set distance between the lip section 52 of gutter cover 50 and the front wall 32 of gutter 30. This is possible because the distance between the lip section 52 of gutter cover 50 and fold 58 is a predetermined distance and because the location of the apertures 42 on hanger 40 within which bracket 100 may be placed is also predetermined. Hence, by coupling bracket 100 to hanger 40 and coupling member 112 of bracket 100 to gutter cover 50, lip section 52 of gutter cover 50 will always be positioned in substantially the same position and distance with respect to the front wall 32 of gutter 30. This can also be achieved with other embodiments of bracket 100, discussed below, since such embodiments would also provide a fixed position for coupling member 112 in relation to the front wall 32 of gutter 30. Although the foregoing embodiment of the present invention preferably includes a coupling member 112 for attaching bracket 100 to cover 50, it should be understood by those with skill in the art that bracket 100 may also be attached to cover 50 by other means, such as fasteners, snap fittings or similar means.

Figs. 13 through 17 depict a second embodiment of bracket 200, which is designed to operate independently and without any interaction with hangers or similar means. More specifically, bracket 200 generally includes base member 204, a front member 206, a rear member 208 and intermediate member 210 and acts to integrate the functionality provided by bracket 100 and hanger 40 (discussed above). For supporting the bracket within the gutter 30, base member 204 also includes a lower support member 220 and an upper support member 216. The lower support member 220 is designed to be

positioned flush against rear wall 36 and the upper support member 216 is designed to be removably coupled to gutter 30. Intermediate support member 218 may also be included to increase the structural support of bracket 200. The combination of the upper support member 216, the base member 204 and the rear support member 220 act to replace prior art hangers 40 and to provide improved structural support for gutter 30. For strengthening the structural integrity of the bracket 200, a central wall portion 222 that fills in the area between the front member 206, intermediate member 210, rear member 208 and the base member 204 may also be provided. The central wall portion 222 may also include a plurality of apertures for allowing objects to extend transversely through the bracket 200 or to be attached to the bracket 200. For example, a first aperture 224 may be provided to receive a heating member, such as a wire or coil, that may be run perpendicularly to the bracket 200 to counteract gutters being blocked by ice or snow. In addition, a second aperture 226 may be provided to receive an attachment means, such as straps. The strap may be used to connect the bracket 200 to the structure by fastening one end of the strap to the structure 20 and tying the other end to the second aperture 226 of the bracket 200.

As shown in Figs. 9 and 13, front and rear members 206, 208 and coupling member 212 operate similar to front and rear members 106, 108 and coupling member 112, which are described in connection with the first embodiment above. Fig. 13 also shows a diagonal bore 214 for receiving a nail (not shown) for securing bracket 200 to the facia 22 of structure 20. Although the diagonal bore 214 is preferably located in intermediate member 210 and extends to lower support member 220, it should be appreciated that the diagonal bore 214 may be located differently and still achieve its

intended purpose. It should also be appreciated that nail may also be replaced by a screw or similar fastening means for securing the bracket 200 and gutter 30 to structure 20.

Bracket 200 may be formed by using standard injection molding techniques. While bracket 200 is preferably comprised of injection molded plastic, bracket 200 may also be made of other metals, vinyl materials, plastic or any other material which is light-weight, inexpensive and capable of acting as a rigid support member. Bracket 200 may also assume varying shapes and thicknesses depending on the environment with which it is being used without departing from the scope of this invention.

Since gutters 30 are available in different standard sizes (i.e., with different depths), an extension member 300 may be provided. To allow extension member 300 to be connected to lower support member 220, extension member 300 may be designed to mirror the outer periphery of lower support member 220 of bracket 200, as shown in Figs. 18 through 22. While it is preferred that extension member 300 is approximately one inch deep, extension member 300 may assume varying depths to accommodate differently sized gutters.

Moreover, for attaching extension member 300 to bracket 200, extension member 300 may be removably connected to lower support member 220 by a snap fitting. For example, as shown in Fig. 17, the outer periphery of the lower support member 220 may include two sets of notch portions 222a, 222b and 224a, 224b located on opposed sides of lower support member 220 and on the upper and lower portions thereof. As shown in Fig. 18, extension member 300 may include corresponding snap fittings 302a, 302b and 306a, 306b, which each include a barbed portion 304a, 304b and 308a, 308b that acts to releasably secure extension member 300 to lower support member 220. It should be

appreciated that the snap fittings 302a, 302b and 306a, 306b are flexible and therefore, capable of pushing outward in order to allow barbed portions 304a, 304b and 308a, 308b to move past the edge of notched portions 222a, 222b and 224a, 224b. Once the snap fittings 302a, 302b and 306a, 306b move past the barbed portions 304a, 304b, and 308a and 308b, the tension created by this flexing will force the snap fittings 302a, 302b and 306a, 306b back toward the lower support member 220 and secure the extension member 300 to the lower support member 220.

Extension member 300 may be formed by using standard injection molding techniques. While extension member 300 is preferably comprised of injection molded plastic, extension member 300 may also be made of other metals, vinyl materials, plastic or any other material which is light-weight, inexpensive and capable of acting as a rigid support member. Extension member 300 may also assume varying shapes and thicknesses depending on the environment with which it is being used without departing from the scope of this invention. For example, extension member 300 may be of a different size in order to allow bracket 200 to be extended by the desired length. Because the periphery of extension member 300 mirrors that of lower support member 220, it may even be possible to couple more than one extension member 300 to bracket 200, i.e., by coupling an extension member 300 to another extension member 300, as needed. It should also be appreciated that the geometry of the lower support member 220 may be altered so long as the extension member 300 is able to be removably attached thereto and that other means for removably attaching extension member 300 to bracket 200 may also be used.

It is common in the industry for structures such as structure 20 to form inside and outside corners, rather than have just straight lines. Gutters, such as gutter 30, must track these inside and outside corners. In order to allow the present invention to also track any inside and outside corners formed on structure 20, an inside corner mullion 400 and an
5 outside corner mullion 450 may be provided. As shown in Figs. 24 through 28 and Figs. 29 through 33, each of these mullions 400, 450 are designed to join two abutting gutter covers 50, where the gutter covers are positioned at different angles with respect to one another. The corner mullions 400, 450 each mirror the geometry of the edge 50a of the respective gutter cover 50 and include a channel 402a, 402b, 452a, 452b for receiving the
10 edge 50a of the respective gutter cover 50. While each of the corner mullions 400, 450 require edge 50a to be cut at a specific angle, it should be appreciated that the required angle may be varied by providing corner mullions 400, 450 with varying angles. Corner mullions 400, 450 may be formed by using standard injection molding techniques. While corner mullions 400, 450 are preferably comprised of injection molded plastic, corner
15 mullions 400, 450 may also be made of other metals, vinyl materials, plastic or any other material which is light-weight, inexpensive and capable of acting as a rigid support member. Corner mullions 400, 450 may also assume varying shapes and thicknesses depending on the environment with which it is being used without departing from the scope of this invention.

20 For sealing the ends of both gutters 30 and gutter covers 50, an end cap 500 may be provided. This is accomplished by providing an end cap 500 that includes a gutter cap portion 502 and a gutter cover portion 504. As shown in Figs. 34 through 38, to attach end cap 500 to gutters 30, the gutter cap portion 502 may also include a gutter cap fold

508. In addition, fold 508 may also include a plurality of holes 510 for receiving fasteners (not shown) for attaching gutter cap 500 to gutter 30. End cap 500 may be formed by using standard injection molding techniques and may be made of materials, such as plastic, metals, vinyl materials, plastic or any other material which is light-weight, inexpensive and capable of acting as a rigid support member. End cap 500 may also assume varying shapes and thicknesses depending on the environment with which it is being used without departing from the scope of this invention. Although Figs. 34 through 38 show a pair of end caps 500, which are mirror images of each other and which form an integral unit, this unit may be cut into two end caps on-site or prior to distribution. It is preferred, however, that two end caps 500 be manufactured at a time.

While specific embodiments of the invention have been described in detail, it will be appreciated by those skilled in the art that various modifications and alternatives to those details could be developed in light of the overall teachings of the disclosure. Accordingly, the particular arrangement disclosed is meant to be illustrative only and not limiting as to the scope of the invention which is to be given the full breadth of the appended claims and any equivalents thereof.